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Remarks

Claims 1-2, 4-13, 15 and 16 are pending in the application. Claim 2 is cancelled. Claims 1, 4-6, 9-13 and 16 are amended. Claims 7, 8 and 15 continue unamended.

Claims 1, 2, 4, 5, 7, 8, 9 and 16 are provisionally rejected under the Judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846).

Claims 1-2, 7, 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev et al. (hereinafter Mamyshev) in view of US Patent No. 6,650,846 by Ito.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 6,097,525 by Ono et al.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Published Application No. 2003/0002121 by Miyamoto et al.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 6,724,829 by Tzukerman et al.

Claim 6 is also rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Published Application No. 2004/0081470 A1 by Griffin.

Claims 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 6,005,702 Suzuki et al.

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 5,745,613 Fukuchi.

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Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 4,847,477 by Smith.

Each of the various rejections and objections are overcome by various amendments and arguments that are presented.

Double Patenting Rejection

Claims 1, 2, 4, 5, 7, 8, 9 and 16 are provisionally rejected under the Judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846). The Applicants respectfully traverse.

The Applicants note that the claims of the primary reference (Liu) employ an orthogonal polarization for adjacent pulses in a sequence of RZ pulses. This is simply not the same as the present claims. Irrespective of the disclosure of Ito, the combination of Liu's claims and Ito's disclosure differs from the present invention and, therefore, the rejection for obvious-type double patenting should be withdrawn.

Rejection Under 35 U.S.C. 103(a)

Claims 1-2, 7, 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito. The applicants respectfully traverse.

Claim 1 as amended recites:

“Apparatus adapted for use in an optical communication system, comprising:

a modulator, for modulating an optical phase of pulses within a sequence of return-to-zero (RZ) pulses in accordance with an input digital data stream to form an optical phase modulated signal in which each pulse in the sequence of RZ pulses has associated with it a phase that is different than a phase of pulses temporally adjacent to it; and

a means for applying the optical phase modulated signal to a dispersion managed optical transmission medium.”

In contrast to the above-quoted claim language, both the Mamyshev and Ito references fail to disclose, teach or suggest at least the step of: “modulating an optical phase of pulses within a sequence of return-to-zero (RZ) pulses in accordance with an

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input digital data stream to form an optical phase modulated signal in which each pulse in the sequence of RZ pulses has associated with it a phase that is different than a phase of pulses temporally adjacent to it....”

Specifically, the Mamyshev reference discloses a RZ optical data transmitter. The transmitter includes a CW optical source, a phase modulator and an electrical RZ data generator. The phase modulator modulates the CW optical signal phase in accordance with the RZ data from the RZ data generator to produce an output optical spectrum, which includes Stokes and anti-Stokes portions. The Office Action admits that Mamyshev does not disclose a dispersion managed link. However, the Office Action asserts that Ito teaches a dispersion managed link for dispersion compensation and concludes that it would have been obvious to combine the dispersion managed link of Ito with the optical transmission link of Mamyshev in order to compensate for dispersion and thereby improve transmission quality.

Mamyshev teaches a modulator that modulates an optical signal phase in accordance with the data from the RZ generator to produce an output optical spectrum that includes Stokes and anti-Stokes portions. An optical filter is used to select either the Stokes portion or the anti-Stokes portion corresponding to the RZ optical data stream for transmission (i.e., column 4, lines 17-24). This is entirely different from the claimed invention.

The phase modulator of Mamyshev does not modulate the phase of the pulses being transmitted such that there is a phase difference between temporally adjacent pulses. The transmitted and received optical signal in Mamyshev is a return-to-zero on-off-keying (RZ-OOK) signal, in which information is carried by modulating optical signal intensity. A data of “1” is represented by an optical signal intensity of a specific duration, and a data of “0” is represented by the absence of an optical signal intensity for the same duration. This optical signal is entirely different from the optical signal in the claimed invention. Thus, irrespective of the teachings of Ito, the Mamyshev reference fails to disclose or suggest the claim language upon which the rejection is based.

Thus, claim 1 is patentable because Mamyshev and Ito, either singly or in any combination, fail to disclose, teach or suggest at least “modulating an optical phase of

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pulses within a sequence of return-to-zero (RZ) pulses in accordance with an input digital data stream to form an optical phase modulated signal in which each pulse in the sequence of RZ pulses has associated with it a phase that is different than a phase of pulses temporally adjacent to it.”

Since independent claim 16 includes relevant limitations similar to those of claim 1, it is respectfully submitted that this claim is also patentable for at least the reasons discussed above with respect to claim 1. Finally, since claims 4-13 and 15 depend from claim 1 and recite additional limitations therefrom, these claims are also patentable for at least the reasons discussed above with respect to claim 1.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 6,097,525 by Ono et al. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Published Application No. 2003/0002121 by Miyamoto et al. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 6,724,829 by Tzukerman et al. Claim 6 is also rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Published Application No. 2004/0081470 A1 by Griffin. Claims 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 6,005,702 Suzuki et al. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 5,745,613 Fukuchi. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,072,615 by Mamyshev in view of US Patent No. 6,650,846 by Ito and in further view of US Patent No. 4,847,477 by Smith.

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Each of the grounds of rejection applies only to dependent claims, and each is predicated on the validity of the rejection under 35 U.S.C. 103 for the corresponding independent claims. Since the rejection of the corresponding independent claims under 35 U.S.C. 103 has been overcome, as described hereinabove, and there is no argument put forth by the Office that any other additional references supplies that which is missing from Mamyshev in view of Ito to render the independent claims unpatentable, these grounds of rejection cannot be maintained.

Therefore, applicants' claims 1, 4-13, 15 and 16 are allowable under 35 U.S.C. 103(a).

Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, the Examiner is invited to call Eamon Wall or Jasper Kwoh at (732)530-9404 so that arrangements may be made to discuss and resolve any such issues.

Respectfully,

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